Looking at Materials Technology (Wood) and Construction Studies

Teaching and Learning in Post-Primary Schools

PROMOTING THE QUALITY OF LEARNING

AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA | DEPARTMENT OF EDUCATION AND SCIENCE
INSPECTORATE

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Foreword

Encountering and engaging with a large range of technologies is a fundamental aspect of modern living. Developing confidence among students in managing these encounters is a significant goal for all technology education and is achieved by learning about and through a range of technology subjects and technologies in schools.

Materials Technology (Wood) and Construction Studies are two related technology subjects that have formed a significant part of the curriculum in Irish post-primary schools for many years. Both have contributed significantly to developing technological confidence, knowledge and skills among post-primary students.

Looking at Materials Technology (Wood) and Construction Studies is one of a series of composite reports prepared by the Inspectorate. It presents the findings of subject inspections in post-primary school between September 2004 and May 2006 and contains recommendations and examples of good practice.

This report analyses the quality of practice in schools in the areas of subject provision, planning and preparation, teaching and learning and assessment of the subjects and reflects current practice in teaching Materials Technology (Wood) and Construction Studies.

It is hoped that this composite report will provide advice and support for schools and teachers and that it will encourage dialogue, assist in the process of school self-review, and provide suggestions for improvement. It should also be of interest to those involved in educating and supporting teachers of Materials Technology (Wood) and Construction Studies, and all who have an interest in these subjects.

Gearóid Ó Conluain
Deputy Chief Inspector

Chapter 1

Introduction

1.1 Background

Materials Technology (Wood) (MTW) and Construction Studies (CS) are two of eight technology subjects available at present on the post-primary curriculum. They are generally offered as optional subjects in the junior and senior cycle, respectively.

The pairing of MTW and CS in this report reflects the long-standing close association that has existed between these subjects. Students who take MTW in the junior cycle usually transfer to the study of CS as a follow-on subject in the senior cycle.

The educational objectives of the two subjects are broadly similar, as they aim to contribute to students' general education within the framework of the post-primary curriculum. MTW and CS seek to

- encourage students to develop the ability to solve practical problems in an innovative and creative manner through the application of appropriate knowledge and skills by devising and executing solutions in a systematic manner through the mechanism of the design process
- develop qualities in students that will emphasise their role in creatively and sustainably shaping and enhancing their environment
- introduce students to the concepts, knowledge and skills associated with construction technology, materials and practices through theoretical study and the completion of integrated projects
- develop students' abilities to communicate ideas and information graphically, orally, and in writing
- apply accurate observation and scientific investigation to exploring the characteristics of materials and processes.

1.2 Categories and types of schools inspected

Sixty-two subject inspections in MTW and CS were used in compiling this report. The majority of these were stand-alone subject inspections but a minority were carried out as part of whole-school evaluation (WSE). The inspections were carried out by inspectors of the Department of Education and Science during the school years 2004/05 and 2005/06.

Schools by category	Voluntary secondary schools	29	46.8%
	VEC schools	24	38.7%
	Community and comprehensive schools	9	14.5%
	Total	62	100%

Schools by sex	Co-educational schools	52	83.9%
	Single-sex boys' schools	10	16.1%
	Single-sex girls' schools	0	—
	Total	62	100%

Schools by main language of instruction	English-medium schools	53	85.4%
	Irish-medium schools in the Gaeltacht	9	14.6%
	Irish-medium schools outside the Gaeltacht	0	—
	Total	62	100%

A total of 132 teachers were visited, and the inspectors usually stayed for at least two lessons with each teacher. The inspections included visits to first, second and third-year classes, Transition Year (TY) groups, and fifth-year and sixth-year CS groups. Junior-cycle MTW students in the classes visited were following the Junior Certificate (JC) programme or the Junior Certificate Schools Programme (JCSP), while students in fifth year and sixth year were studying CS for the established Leaving Certificate (LC) or the Leaving Certificate Vocational Programme (LCVP). TY students generally studied an MTW or CS module designed in a particular school.

The great majority of MTW and CS subject inspections were of one day's duration, while a minority were conducted over two days, either because of the large number of teachers involved or because of difficulties associated with visiting an appropriate sample of classes in the junior and senior cycle in a single day.

1.3 Structure and purpose of this report

Looking at Materials Technology (Wood) and Construction Studies is a composite report based on the subject inspection reports issued to schools following inspections. Like the subject inspection reports on which it is based, this composite report analyses and comments on the manner in which:

- schools provided for MTW and CS
- teachers and subject departments planned their work
- teaching and learning occurred in the classrooms
- students' development and progress were assessed.

This publication is intended as a resource for teachers, school authorities and policy-makers and aims to promote best practice in teaching and learning in MTW and CS, based on good practice observed during the inspections.

Chapter 2

The quality of subject provision and whole-school support

2.1 MTW and CS teachers

In the schools considered for the purposes of this report, the subjects were generally taught by qualified, expert, enthusiastic and often inspiring teachers. Occasionally, teachers qualified to teach in other subject areas were encountered teaching MTW and CS. Having such teachers operating in specialist classroom situations gives rise to obvious health and safety considerations. In addition, only teachers qualified to teach the subjects can ensure delivery of the syllabuses in their entirety. It was recommended as a priority, therefore, that only teachers qualified to teach the subjects be employed to do so.

As teachers teach the subjects in both the junior and the senior cycle, it is desirable, where possible, that all such teachers maintain contact with both subjects throughout their career. This practice was not always encountered during the inspections. Teachers sometimes specialised exclusively in teaching one or other syllabus, often for organisational reasons in a school. It was recommended in such circumstances that schools make provision for teachers to teach both MTW and CS classes, so as to ensure that they can maintain and develop their specialist teaching skills and be in a position to contribute meaningfully to discussion within the subject department.

One inspection report noted:

> There are two teachers of MTW and CS in the school. At present CS is taught exclusively by one member of the subject teaching team and MTW exclusively by the other . . . It is suggested that as the opportunity arises, both members of the teaching team should be involved in teaching the subjects in both junior and senior cycle. This will have the advantage of providing a context in which collaborative planning for the development of the subjects is facilitated and encouraged.

Teachers' contact with both subjects in the junior and senior cycle will become increasingly important over the coming years when the new Leaving Certificate Architectural Technology (AT) syllabus will be introduced and the junior-cycle MTW syllabus will be reviewed.

A national programme of continuing professional development (CPD) for teachers of MTW and CS has not been provided for many years. However, many of the teachers of these subjects also teach Leaving Certificate Design and Communication Graphics and Leaving Certificate Technology, and an extensive CPD programme for these subjects is now being provided by the Technology Subjects Support Service (T4). A similar programme to support the implementation of the new Architectural Technology syllabus will be made available before its introduction in the near future.

The inspectors commended the level of support and facilitation provided by school authorities for teachers taking part in the current CPD programmes in Design and Communication Graphics and Leaving Certificate Technology since the advent of T4.

Features of good practice

- Teachers were experts and exuded enthusiasm and love of their subject during almost all lessons
- The subjects were taught by fully qualified teachers in almost all instances
- CPD for teachers was facilitated and encouraged by the school management in all schools

Concerns

- Teachers qualified in other subjects were teaching MTW and CS in a small number of instances
- Use of these non-qualified teachers is a potential source of health and safety concerns due to the specialist nature of the MTW and CS classroom

2.2 Timetabling

In general, the inspectors found that the time allocation for both MTW and CS was appropriate for the teaching of the syllabus in each subject. Generally a minimum of four class periods per week was allocated for MTW in first, second and third year and a minimum of five class periods per week for CS in fifth and sixth year. These allocations were usually distributed evenly throughout the school week, and this provided optimum exposure to the subjects and ensured continuity of contact. Allocations greater than these minimums were also occasionally encountered.

The inspectors encountered a variety of timetabling arrangements for MTW and CS in Transition Year. In some schools, for example, a double-period lesson was timetabled throughout the school year, while in other schools a modular arrangement was encountered. In these instances four periods per week were generally allocated to the module over a fixed period.

Because of the nature of the subjects, timetabled allocations that include both double and single periods are necessary, and this type of provision was usually encountered. Occasionally, however, double periods were timetabled across breaks but this arrangement is not ideal and should be

avoided. Triple class periods were also encountered occasionally and some teachers commented on the positive aspects of being able to engage in prolonged practical activities during such a period. However, the provision of triple class periods is not recommended as they provide students with less frequent exposure to the subjects during the school week.

In some schools first-year students were provided with a taster programme of optional subjects, and the time allocation for MTW was reduced to make this possible. Where such a programme resulted in reduced contact time for MTW over the course of first year it was recommended that the teachers of all the technologies become involved in careful joint planning to ensure that an integrated cross-curricular approach is adopted. In one school, for example, the inspector commented:

> It is commended that all students are given the opportunity to experience each optional subject before making choices in second year for Junior Certificate . . . In general, the time allocated to MTW . . . in first year may be adequate to allow the respective syllabuses to be covered if care is taken to fully exploit opportunities for cross-curricular support among the three technology subjects studied . . . It is recommended that the teaching team of the technology subjects review the programmes of work . . . in first year to exploit all opportunities for cross-curricular support, and consider the most effective way to rationalise, in particular, the project-design work to be undertaken in the subjects.

In some schools extra MTW lessons were provided for students with special educational needs (SEN), and these arrangements were usually made within the framework of full educational provision for these students. The inspection reports recommended that extra emphasis be placed on the support of literacy and numeracy related to the subjects when students were withdrawn from these lessons for learning support (LS).

MTW and CS students sometimes engaged in co-curricular and extracurricular activities, and the development of co-curricular links by teachers and students with related subjects and programmes was often encouraged during the inspection process. The inspectors also commented favourably on students' involvement in activities outside the formal curriculum, including activities designed to benefit the whole school community.

Features of good practice

- A minimum of four periods was timetabled in first, second and third year for MTW in almost all schools
- There was generally an adequate timetable provision for the TY module
- A minimum of five periods was timetabled for CS in fifth and sixth year in almost all schools
- Both double and single periods were included in the timetable allocation for MTW and CS in most schools

Concerns

- Inadequate time was allocated to the subjects in a small number of schools
- Inappropriate units of time were allocated in a small number of schools

2.3 Deployment of teachers

Invariably, mixed-ability MTW and CS class groups were encountered during inspections, and teachers generally taught the ordinary and higher-level syllabuses simultaneously. As a result, MTW and CS teachers had developed considerable expertise in the area of teaching mixed-ability classes. However, mixed-ability teaching proved challenging for teachers in certain circumstances, and the inspectors recommended access to professional support in such cases, such as that provided by the Second Level Support Service (SLSS).

The use of collaborative (team) teaching was very rarely encountered during inspections. Where resources allow, such an approach can bring considerable benefits: for example, it can provide a richer learning environment for students. It may also be used to accommodate the learning needs of students whose needs cannot usually be met within the standard lesson. When team teaching is used it may be possible to accommodate them, as an alternative to the withdrawal of those whose needs cannot usually be met within the standard lesson. One report commenting on team teaching stated:

> In one of the lessons visited a team-teaching approach involved a learning-support teacher and the MTW teacher working closely together in a theory class. This approach was

very effective, due in a large part to the high quality of preparation for the lesson by both teachers, their longer-term planning and the support of the college as a whole.

2.4 Arrangements for students' access

2.4.1 Support for students in making subject choices

The large majority of schools offered excellent support for students when they were selecting optional subjects. These included open days and information evenings for students and their parents before entering first year, TY or fifth year and information sessions with guidance counsellors, subject teachers, year heads, principals, and deputy principals. A variety of taster programmes, such as those alluded to earlier, for first-year students and modular subject programmes in TY was also encountered.

Schools offering TY usually provided a module-related MTW and CS as part of the programme. In a small number of schools, however, such a module was not available, even when the subjects were available on the school's curriculum. Where this was encountered it was recommended that a module designed by teachers be incorporated in TY.

It was also noteworthy that the design of many TY modules tended to concentrate on design-and-make projects, similar to those encountered in junior cycle MTW. In such instances the inspectors suggested that a module designed to prepare students for entry to CS at Leaving Certificate would be more in keeping with the aims of the TY programme. The planned introduction of the new Architectural Technology syllabus should prompt a review of all existing TY programmes to reflect the changed emphasis of this senior cycle syllabus. When the gender imbalance in CS is being considered it should also be noted that exposure to a module more closely related to CS in TY has the potential to positively affect the uptake of the subject by girls in many schools.

The majority of schools had arrangements that allowed students to move into or out of MTW and CS class groups, within the constraints of timetabling and class size.

2.4.2 Subject choice

MTW and CS are generally optional subjects, and therefore students may choose to study them. In a very small minority of schools, however, the subjects formed part of the curriculum for all.

The subjects were popular among boys in the large majority of schools, often resulting in provision being made in more than one of the school's optional subject bands. These arrangements could only be made, however, when the school had enough teachers for such intensive provision of the programmes. Where demand was greater than the school could accommodate, arrangements were often made for selecting students to study the subjects. Although this was not a common problem, instances where such systems operated were encountered during inspections, and it was recommended in such cases that great care be taken in devising a fair and transparent system for allocating places.

The provision of taster programmes was commended, as it helps to ensure a high level of support for students in making their subject choices. However, the inspectors also recognised that it was not always practicable for schools to provide such programmes, especially in smaller schools with limited teacher resources. The use of other options for students was recommended in such circumstances.

In the majority of schools visited the design of subject-option groups was based on the expressed preferences of students. This was usually characterised by an initial free choice from all the optional subjects offered, whether in the junior or senior cycle, followed by the formation of bands based on students' choices. This process was sometimes constrained by the considerations of timetabling and class size alluded to earlier. Where an open choice of optional subjects was not provided in such a way, it was recommended that it be introduced in order to meet the needs of students.

2.4.3 Gender imbalance

In most of the schools visited there was a marked imbalance in uptake, with significantly more boys than girls studying the subjects. This was particularly marked in the case of CS, even in schools where there was a strong uptake of MTW by girls in the junior cycle. In general, however, the schools' procedures for students' choice of subjects did not discriminate between students on the grounds of sex. Rather, girls chose not to study the subjects.

The inspectors frequently encountered MTW and CS class groups with a significant gender imbalance. In such instances the inspectors always made a recommendation that the factors governing students' subject choice be examined by the school authorities. This recommendation was intended to encourage schools and MTW and CS subject departments to take the steps necessary to ensure that the stereotypical view that MTW and CS are boys' subjects is addressed. One report commented that girls are well represented in MTW in junior

cycle while CS class groups in fifth and sixth year were comprised predominantly of boys. The inspectors recommended that the school should examine ways to encourage and enable a higher takeup of the subjects by girls.

Features of good practice

- First-year students experienced MTW before making their optional subject choices in a considerable number of schools
- MTW and CS were offered as part of an open choice to students in the majority of schools
- TY programmes incorporated an MTW or CS module in most schools

Concerns

- The subject option bands were restrictive in a small number of schools
- TY did not have an MTW or CS module, or the module did not act as an introduction to senior cycle CS in a small number of schools
- Few girls took the subject in most schools

2.5 Provision of resources

2.5.1 Specialist classrooms

The quality and maintenance of MTW or CS specialist classrooms (woodwork rooms) was often commended in inspection reports, and this reflected a general commitment on the part of schools to high-quality provision. Generally, woodwork rooms were used exclusively for the teaching of MTW or CS, but occasionally they were also used as general classrooms. Where this was encountered the inspectors recommended that woodwork rooms be reserved exclusively for the teaching of MTW and CS. This recommendation was based on the health and safety implications of having students in the rooms with non-specialist supervision and also to allow MTW and CS teachers to have access to the rooms for preparation and maintenance purposes when lessons were not timetabled.

Ideally, each MTW and CS teacher should be based in their own woodwork room, and this was often the case in larger schools. In many smaller schools, however, rooms had to be shared. Generally, there was a very high level of co-operation among teachers, and this ensured that difficulties related to sharing a room were kept to a minimum. Despite this co-operation, however, sharing a room often proved to be problematic. Sometimes problems related to the nature of the

subjects and the amount of practical and project work that had to be completed. In other schools, with separate junior-cycle and senior-cycle woodwork rooms, difficulties were reported when senior cycle lessons were scheduled in junior cycle rooms; and recommendations to ameliorate this situation were made, as follows:

> The senior workshop is larger, designed primarily to accommodate classes for CS . . . The junior workshop, designed for the teaching of MTW, is smaller and wood-preparation machinery further restricts its usable area . . . It is recommended, where possible, that the senior workshop be used for the teaching of CS to senior cycle classes, particularly when these classes are large. It is recommended that the junior workshop be used for teaching smaller junior cycle classes where possible.

It was worth noting that workshops did not always provide an ideal setting for teaching the drawing or theory elements of the programmes. Teachers often used alternative rooms for these purposes, in order to provide the optimum environment for teaching and learning.

One difficulty encountered in many schools was the lack of space for storing students' project work. This work comprised current and completed work and projects associated with the State examinations. This was usually not an issue in schools that had relatively new woodwork rooms, but in older, more traditional rooms, where only a wood store was provided, usually at the rear, the lack of storage space was frequently raised by teachers and principals. Where difficulties relating to storage were encountered it was recommended that an appraisal of the needs of the subjects be undertaken, with regard to the space available in the particular schools.

2.5.2 Provision of materials

MTW and CS are activity-based subjects, involving significant levels of practical work, and they require the provision of appropriate materials. The quality of provision of materials for the teaching of MTW and CS was generally very good, and either an annual budget for the subjects or a requisitioning system was operated by all schools.

Teachers' engagement in effective subject planning was greater where annual budgets were provided for equipment and materials. Access to a budget allowed planned purchasing by the subject department and facilitated long-term and short-term planning by teachers. This form of provision was often commended by the inspectors. One report noted particularly good practice in budgeting for and ordering materials:

> There is an annual budget allocated to MTW and CS. The subject-teaching team discusses the needs of the subject areas. Materials and equipment are bought by means of an order book system through the college office. In general the balance of the budget is spent on necessary equipment once sufficient class materials have been purchased.

However, in most schools the equipment and materials were supplied when requested by teachers. The large majority of requests were favourably received and resulted in the provision of the required resources.

MTW and CS facilities and equipment were generally maintained by teachers, and this was an important aspect of their work. The methods adopted often depended on the type of school and varied from the highly formalised use of stock books to keeping lists of equipment. The inspectors recommended that schools always adopt properly structured control practices and procedures in order to maintain appropriate levels of equipment and materials and to ensure the efficient use of funds.

Features of good practice

- The facilities for teaching MTW and CS, including rooms and equipment, were appropriate in almost all instances
- The quality of provision of materials for the teaching of MTW and CS was generally very good
- Schools generally operated either an annual budget for the subjects or an efficient requisitioning system for resources

Concerns

- The facilities or equipment for teaching the subjects were inadequate in a few instances

2.6 Health and safety

2.6.1 A safe environment for teaching and learning

Most schools had a health and safety statement formulated by external consultants, and this generally referred specifically to the woodwork rooms. Arrangements for the review and updating of the statement had been made in many schools, often through School Development Planning Initiative (SDPI) activity. Reports typically commented on health and safety as follows:

> There is good provision made for the health and safety requirements . . . The health and safety officer visits the school several times per year and consulted closely with the subject teachers when the school's health and safety statement was being formulated. One member of the CS/MTW subject department fulfils health and safety duties as part of his post of responsibility.

Frequently, the inspectors recommended that health and safety statements be reviewed regularly, and that these reviews should involve the MTW and CS subject department.

The installing of dust-extraction facilities in specialist MTW and CS classrooms has advanced well in recent years. In schools where this work still remained to be done it was

recommended that the provision of an appropriate system be expedited through the Planning and Building Unit of the Department of Education and Science under the provisions of Circular Letter M45/01. The inspectors also recommended that teachers be consulted during the design and installation of systems, in order to ensure that their expertise as subject specialists be used to inform the design, installation and operation of the extraction systems. Additional funding for personal protection equipment (PPE) in woodwork rooms is also available from the department under the terms of Circular Letter PBU 5/2005.

2.6.2 Fostering a safety culture

Woodwork rooms are generally recognised as high-risk areas, where the cultivation of a health and safety culture among students is of paramount importance. The inspectors found that in general this safety culture was being promoted among the users of woodwork rooms.

In the majority of schools the visual environment in woodwork rooms incorporated standard safety signage related to the use of specific pieces of machinery, and safe operating areas were marked on the floor around major pieces of equipment. However, posters relating to the appropriate and safe use of hand and portable power tools were encountered much less frequently, despite the everyday use of these pieces of equipment. Recommendations were frequently made concerning the display of such posters. Posters may be purchased or, preferably, developed by MTW and CS class groups (for example as a health and safety project) under the direction of the teacher, as part of the promotion of health and safety awareness among MTW and CS students. One report recommended:

> In order to emphasise safety in the woodwork rooms, a specific code of behaviour, compatible with the school's general code of behaviour, should be developed and prominently displayed in all woodwork rooms. Safe operating procedures for hand and machine tool use and general workshop safety should also be prominently displayed.

Teachers generally modelled best health and safety practice in all their activities, and appropriate practices and procedures (for example in the case of accidents) had usually been adopted. Significantly, *Review of Occupational Health and Safety in the Technologies in Post-Primary Schools* (2005) was being used to inform all health and safety practices in many schools; but where this was not the case it was recommended that the situation be remedied as a priority.

Woodwork rooms were generally very well organised, and high standards of housekeeping were usually encountered. Such organisation and order promoted the woodwork room

as a broader learning environment and not just as a place in which to undertake practical and project work. The learning of order in approaching tasks, the promotion of due regard for health and safety, mutual respect for peers and teachers and awareness of the immediate environment were some of the wider areas addressed by maintaining high standards of organisation and tidiness in the woodwork room.

Features of good practice

- In most instances the school's health and safety statement made specific reference to the woodwork room (or rooms)
- Health and safety awareness was being promoted, and there were safe practices and procedures in almost all classrooms
- Health and safety signs and posters were prominently displayed in the majority of woodwork rooms
- Teachers used *Review of Occupational Health and Safety in the Technologies in Post-Primary Schools* (2005) to inform all health and safety practices and procedures in most schools
- There was an appropriate dust-extraction system in use in almost all schools

Concerns

- Health and safety procedures and practices had not been adequately developed or promoted in a small number of schools
- Teachers did not use *Review of Occupational Health and Safety in the Technologies in Post-Primary Schools* (2005) to inform health and safety practices in a small number of schools
- Health and safety signage and posters in a small number of instances were inadequate
- There was no dust-extraction system in use in a few schools

2.7 ICT facilities

Although excellent individual examples of teachers' and students' use of information and communications technology (ICT) were encountered in the schools, the inspectors reported that the use of ICT facilities was generally quite low. Examination years were an exception to this pattern, as students in those classes often used word-processing when presenting their design briefs. However, the inspectors frequently made recommendations concerning better provision of and access to appropriate ICT hardware and software. Teachers were often encouraged to increase the use of available ICT facilities and to arrange for computer-aided design (CAD) to be made available.

Teachers and students in some schools had access to appropriate hardware and computer-assisted drawing software in woodwork rooms, but in most schools access was provided in the school's computer room in accordance with a rota. In a number of smaller schools, computer rooms were also being used as base classrooms, and their use by MTW or CS students had to be arranged with the base-class teacher. This type of arrangement often acted as a disincentive to using the computer room regularly for the subjects.

Facilities provided in many schools for the introduction of the new Design and Communication Graphics syllabus in September 2007 include an impressive provision for ICT. The equipment provided is intended for use by students of all the technologies when the timetable requirements of DCG have been met. It is recommended, therefore, that ICT facilities be used to teach *Solid Work* to MTW and CS students when they are available, and it is further recommended that this development be a priority for subject planning in the subjects.

Features of good practice

- Teachers and students had access in almost all schools to appropriate ICT resources

Concerns

- Appropriate ICT resources were not available, or teachers and students had only limited access to these resources in a few schools
- The use of the available ICT facilities was generally quite low



Chapter 3

The quality of planning and preparation

3.1 The MTW and CS subject department

There was clear evidence of planning in the majority of schools inspected. This planning, though effective, was often informal in nature and characterised by high levels of collaboration and co-operation among teachers during periods when they did not have direct contact with students and during their breaks. While such informal planning was often of a high standard, it would usually have benefited from more formal structuring, with regular meetings providing a forum for discussion and added impetus for collaboration and co-operation.

The progress made in most schools towards coherent planning with subject departments has been facilitated by senior managements in recent years. This has resulted in the formation of formal subject departments in many schools and the adoption of formal planning structures, often guided by advice from the School Development Planning Initiative (SDPI). For example, the inspection reports often commented on the existence of collaborative subject department structures for CS/MTW in schools and noted that these had helped with planning for the acquisition of equipment and materials. Some reports also described how collaborative planning had moved on to facilitate the discussion of curricular and methodological issues in the subjects.

In small schools, where one teacher often taught the subjects and the formation of a single-person subject department was impractical, the inspectors often recommended that the school consider forming a technologies department, comprising, for example, the school's Metalwork, Engineering, Technical Graphics and Technical Drawing teachers. Recommendations on improving subject-department planning included the following:

> It is recommended that the MTW and CS subject-teaching team develop a more formal approach to subject department-planning in cooperation with the teachers of Metalwork, Engineering, Technical Graphics and Technical Drawing.

It was found that the development of written subject department plans was well advanced in many schools, and this was frequently commended by the inspectors. However, recommendations relating to the development of planning documents were also made in a significant number of schools.

3.2 Co-ordination and collaboration

The inspectors reported that the arrangements for the co-ordination of MTW and CS subject departments varied considerably. In many schools, co-ordination took place in an informal manner only. In these instances the inspectors recommended that the school seek to establish a formal subject department, and that a co-ordinator be appointed or agreed.

Rotating the responsibility for subject co-ordination among teachers was also frequently recommended by the inspectors, as this acquaints every member of the department with every aspect of planning for the subject, including chairing meetings, recording important decisions, liaison with the senior management, and disseminating official documents. Such a rotation of roles increases the range of skills of the teachers in the department.

Where less formal planning structures existed, the senior teacher of the subjects often acted as subject convenor or co-ordinator. This system also prevailed in many small schools, where one teacher taught both subjects.

In some schools, co-ordination of the individual subjects was often encountered, and individual teachers, deployed predominantly to a particular subject area, often assumed responsibility for that area. For example, in a three-teacher subject department one teacher took responsibility for the co-ordination of MTW, a second teacher assumed responsibility for CS, and the third teacher took responsibility for Technical Graphics and Technical Drawing, as MTW and CS teachers were frequently timetabled to teach Technical Graphics or Technical Drawing. The inspectors believed that the selection of a rotating co-ordinator with responsibility for all the subjects would be preferable to this type of fragmented system, in order to ensure that all teachers maintain their familiarity with all subject areas. The inspectors recommended

> that current high standards in subject planning would be enhanced by the formation of a formal MTW/CS subject department with a co-ordinator. The role of the co-ordinator should be rotated in order to ensure that all teachers become familiar with the role and maintain contact with both subject areas.

As part of the collaborative planning process, it was often recommended that MTW and CS teachers, in conjunction with the school authorities, examine the long-term provision for the subjects in the context of the school. This process

should enable the school to plan for projected uptake and resource requirements envisaged in both the short term and the long term.

Features of good practice

- There was an active MTW and CS department or combined department in many schools
- Formal meetings were supplemented with frequent informal meetings or discussions in almost all schools

Concerns

- In a few schools there was no MTW or CS subject department, or teachers were not part of a combined department
- Planning for the long-term development of the subjects and review of planning were lacking in the majority of schools

3.3 The MTW and CS subject plan

3.3.1 Subject planning documentation

The inspectors encountered a wide range of subject-planning documents during inspections, and this reflected the different stages of development that have been achieved so far by individual schools. These documents ranged from very comprehensive plans to single-page handwritten plans that conveyed very limited information. The inspectors recognised that the relatively poor quality of documents in some schools did not necessarily reflect poor planning, but where comprehensive subject-planning documents were encountered these generally facilitated a well-organised, collaborative and coherent approach to the organising and teaching of the syllabus in the school. Bearing this in mind, the inspectors often recommended that comprehensive rather than minimal plans be developed by subject departments.

The inspectors encountered MTW and CS subject plans that had been developed as separate and as joint documents. In the interests of coherent subject-department planning, and because of the close association of the subjects, a single planning document, which includes the plan for the TY module, is preferable. Collaboratively developed MTW and CS subject plans ensured that all MTW and CS students had a similar range of experiences of the subjects.

3.3.2 Format and essential content of subject plans

When the inspectors encountered comprehensive subject plans these typically included aims and objectives for the subjects in the school, details of the teachers involved in teaching the programmes and their individual responsibilities within the department, the MTW and CS syllabuses, and yearly programmes of work. Sections on practical work, projects, drawing and theory were also included. The subject department's strategy for promoting the design process in both the junior and the senior cycle was also included in some plans.

Further sections in some plans addressed a range of issues. These included students' access to the subjects or levels; the provision of MTW and CS within the various programmes available in the school; the formation of class groups; planning for students with special educational needs; cross-curricular planning; planning for the selection, acquisition, accessibility and use of resources to facilitate teaching and learning; textbooks; Irish; the use of ICT facilities; arrangements for the dissemination of official documents; and health and safety promotion, procedures, and practices. Excellent planning documents also referred to the procedures for monitoring, self-review and evaluation of subject planning in the school.

An analysis of how the aims and objectives of MTW and CS contributed to achieving the general aims of the school, as outlined in its mission statement, was sometimes included in the MTW and CS document. Where this analysis was absent the inspectors recommended that it be developed.

3.3.3 Programmes of work

Programmes of work outlined how and when various elements of the MTW and CS syllabuses were to be taught. Effective programmes of work described the elements of the subject to be provided in each year, the teaching methods to be used, resource requirements, when practical and project work were to be undertaken, how the design process was to be assimilated into teaching and learning, health and safety issues, classroom management strategies, and the arrangements for assessment. One report noted:

> Programmes of work for all year groups have been developed and are being implemented. As a result, the lessons observed were appropriately positioned within the programmes and were appropriately related to the syllabuses.

3.3.4 Planning for access to the subjects

Good subject plans also described the systems operated by schools to facilitate access by students to the subjects, and to

both levels within the subjects. Provision for reviewing these systems was also outlined. Strategies to include students of all abilities in the planned learning experiences were often included in an SEN section in the subject plan and where such a section was not included it was recommended that it be added as a priority.

The design of a school-developed module bridging MTW and CS, and its inclusion in TY is an important task for the subject-teaching team. The writing of such a programme of work for TY was recommended where this had not already been done, and the module should address the needs and interests of students while providing a link between junior cycle MTW and senior cycle CS. The emphasis in this module should be on introducing students to CS and where this was not the case it was recommended that the module descriptor be reviewed as a priority.

3.3.5 Planning for textbooks and teaching materials

Various MTW and CS texts were prescribed and used in many schools. These served as a valuable resource for teachers and students, both inside and outside the classroom. The inspectors noted that textbooks were generally not heavily relied upon during the large majority of lessons they observed; instead the teachers used supplementary materials, developed individually or collectively, and relied on published texts only as an additional resource. The inspectors frequently commended this approach in their reports.

The availability of resources, textbooks and other materials in Irish has been and continues to be a matter of general concern for teachers in Irish-medium schools. The problem is particularly acute in MTW and CS because of the specific technical terminology used in these subjects and the pervasive use of this terminology in the classroom. The inspectors made recommendations in a number of schools that teachers should develop their own resources, and it is noteworthy that teachers in a number of Gaeltacht schools are at present developing appropriate resources collaboratively as a result. One report on an Irish-medium school acknowledged the good work done by teachers in providing alternative learning resources where textbooks were not available:

> De dheasca easpa théacsleabhair oiriúnacha Gaeilge, níl aon téacsleabhar in úsáid don TÁA ná don SF sa scoil faoi láthair. Chun teacht timpeall ar an bhfadhb tá feidhm á baint as nótaí an mhúinteora a chur ar sleamhnáin PowerPoint le neart grianghrafanna agus grafaigh eile. Úsáidtear na nótaí seo le linn na ranganna. Dáiltear cruachóipeanna de na sleamhnáin ar na scoláirí le húsáid don staidéar agus don athdhéanamh. Tá an dea-chleachtas seo le moladh go hard ach go háirithe go dtí go bhfoilseofar téacsleabhair Ghaeilge.

> [Because of the absence of suitable textbooks in Irish, no textbook is being used for either MTW or CS in the school at present. To get around this problem the teacher's notes are put on PowerPoint slides, with plenty of photographs and other graphics. These notes are used during the classes. Printed copies of the slides are distributed to the students for study and reproduction. This good practice is highly commended, especially until Irish textbooks are published.]

The inspectors also commended in their reports the successful efforts of individual teachers to meet the challenge of providing the required language environment.

3.3.6 Planning for ICT

ICT has many applications, both in the teaching and the learning of MTW and CS. Arrangements for its use by teachers and subject departments for the creation of teaching materials for MTW and CS were at various stages of development in the schools visited. In some schools, individual teachers and teaching teams were commended for the quality of their commitment to the use of ICT for the development of resources and as a medium of instruction. The inspectors also noted that when used in a planned, systematic way ICT provided excellent opportunities for self-directed learning.

However, difficulties associated with redundant or obsolete equipment, with access and with the suitability of available ICT resources often resulted in teachers being unable to integrate these resources in everyday teaching and learning in the MTW and CS classrooms. This occurred even though the large majority of teachers were extremely well disposed to the use of ICT in teaching and learning.

The recent provision of computer equipment in schools in conjunction with the introduction of the new Leaving Certificate Design and Communication Graphics syllabus will ensure access to the most up-to-date equipment by students of all the technologies and should ensure that the use of ICT in teaching and learning will become more pervasive in the coming years. The necessary steps should be taken to ensure that this resource is shared and used for teaching and learning, and teachers are strongly encouraged to introduce three-dimensional, parametric CAD to all MTW and CS students at the earliest opportunity.

3.3.7 Planning for the implementation of the design approach

The design approach to the study of MTW is outlined in the syllabus and expressed in the teaching of the subject in many schools. The inspectors also noted a healthy variation of

teaching strategies for its advancement in these schools. In schools where the design process is not being used extensively, the inspectors often recommended that teachers should promote its use through the planning and self-review processes of the subject department.

3.3.8 Planning for assessment

The assessment modes and practices adopted for MTW and CS were often collaboratively developed by the subject department and included in the written subject plan. This was intended to ensure that assessment of and for learning was incorporated in the assessment strategies being employed. Agreed programmes of work and assessment strategies also allowed for concurrent examinations to be scheduled, and this also helped to ensure that all students had similar experience of the subjects, irrespective of the teacher assigned to their class group.

Features of good practice

- Comprehensive MTW and CS plans had been developed in most schools
- Strategies to include students of all abilities in the planned learning experiences were often included in an SEN section in the subject plan
- The quality of planning for the use of ICT was good in some schools

Concerns

- There was no subject plan for MTW and CS, or the content of the subject plan was inadequate in a small number of schools
- The subject plan in a few schools required the inclusion of strategies to include students of all abilities
- Improvement in the quality of planning for the use of ICT was needed in a majority of schools

3.4 Individual teachers' planning

The large majority of MTW and CS teachers engaged in individual planning for classes that complemented departmental planning and facilitated the implementation of programmes in the classroom. The level of engagement with this aspect of the planning process varied considerably, however, and reflected the experience and commitment of the individual teachers.

Lesson planning that was of high quality included consideration of the content of lessons, the use of teaching resources, selection and implementation of differentiated teaching methodologies, and timeframes for teaching the lessons. The completion of planning work that included a variety of modes to assess students' levels of attainment in all areas of the syllabus, practical and theoretical, was seen as good practice.

Features of good practice

- In almost all schools the teachers engaged in individual planning to supplement departmental planning
- Good individual planning
  - o provided for the use of differentiated teaching methodologies and resources
  - o identified clear learning outcomes and assessment strategies within clear timeframes
- Effective individual planning clearly influenced classroom practice and students' learning

Concerns

- Teachers had not supplemented departmental planning with individual planning in a few schools

Chapter 4

The quality of teaching and learning

4.1 Teaching methods

The variety and nature of the teaching methodologies observed during the inspections were generally appropriate to the content of the lessons, the year groups being taught, and the time of year. The approaches employed during the large majority of the lessons provided effective scaffolding for the development of students' learning.

Teachers generally employed, within the context of the design process, a type of cyclical methodology to excellent effect during practical, theory or drawing lessons. This methodology generally involved a demonstration by the teacher, followed by the students working on an assigned task. As students worked, the teacher circulated and engaged with individuals, assessing progress and ensuring engagement with the planned activity. This process was repeated for the various segments of particular lessons. Demonstrations to whole-class groups, smaller groups and individual students were commonplace during the course of MTW and CS lessons.

Excellent practical demonstrations of woodworking and construction processes and skills were observed in the large majority of schools. Demonstrations were also used during drawing and theory lessons, where excellent staged blackboard and whiteboard presentations were used to demonstrate excellence in draughtsmanship and the use of draughting conventions. One report commented:

> During lessons teachers effectively employed a scaffolding approach to the development of student learning. This form of scaffolding was further enhanced when teachers talked through the construction of demonstration drawings and ensured that students both saw and heard how constructions were being completed while they actively constructed their own drawings.

Teachers used appropriately integrated overhead transparencies and excellent scaled and freehand blackboard drawing in lessons, and this provided excellent models of good drawing practice for students. The processes and skills necessary for completing freehand and scaled drawings were also demonstrated during theory lessons.

While excellent chalkboard drawing that modelled good drawing practice was also observed, many teachers now use whiteboards exclusively and have developed their presentation skills to a very high level. The use of this method enabled them to produce presentation drawings of the highest quality.

A variety of teaching aids was used in MTW and CS lessons. These included three-dimensional models and actual materials

and components. Engagement with these tangible teaching aids allowed students' thinking to more easily progress from the concrete to the abstract, where three-dimensional objects are represented in two-dimensional form during theory and drawing lessons. In the absence of exemplars of materials or components, teachers often employed three-dimensional pictorial drawings or digital presentations to aid this progression from the concrete to the abstract, and this practice also worked very effectively.

Technical information was usually introduced incrementally during practical, drawing and theory lessons and was directly related to students' everyday experiences in the majority of instances. This information was often supplemented by examples from the teachers' own experiences.

Teachers of MTW and CS frequently used differentiated methodologies to respond to the needs of mixed-ability classes and to facilitate the inclusion of students with special educational needs. This approach was supported by careful planning of the work programme and particularly through differentiation of the level of difficulty of work, especially with regard to student-centred design projects. Work assigned was generally suited to the interests, needs and abilities of the students.

Team teaching can be an effective approach in classes where students' needs are greater, for example where their behaviour is challenging or where they have severe additional learning needs. The inspectors did not encounter examples of the use of team-teaching in these settings but recommended its adoption in such circumstances.

Where difficulty was experienced in engaging students in the creative process underlying the design approach, it was recommended that design booklets be introduced. These support students while they develop their abilities in restricted areas of the design of an artefact. With a gradual increase in the areas determined by students, the desired design skills are developed. For example, one inspection report contained the following advice:

> The subject teaching team is urged to give prominence to the central place of the design process in the MTW syllabus. To aid students in developing the necessary design process skills it is often desirable to provide them with extra support. This may be achieved by supplying them with teacher-prepared worksheets suitable for their needs in the form of a booklet. The booklet can guide students through the process as they insert the required notes and sketches and may [help them] avoid the frustration sometimes experienced when faced with a blank sheet.

Features of good practice

- A variety of methods and strategies was employed in almost all practical, project, theory and drawing lessons
- Demonstrations of very high quality were regularly used in almost all practical, drawing and theory lessons

Concerns

- In a small number of schools further consideration needed to be given to the variety of teaching methods and strategies in use
- Particular emphasis needed to be placed on differentiated methodologies for the inclusion of all students in some schools

4.2 Classroom management

A very high standard of presentation of MTW and CS lessons was evident in the large majority of lessons, and this contributed significantly to the maintenance of an ordered learning environment, where a definite work ethic was being developed among students.

In the lessons visited, discipline was generally not imposed by the teacher; instead the students' interest and enthusiasm for the subject, coupled with the predominantly active teaching methods employed during teaching and learning, resulted in the establishment of a well-ordered learning environment where procedures were established and clearly understood. Discipline did not usually require enforcement under these circumstances, but where students' behaviour needed correction this was generally provided in a caring and even-handed manner, causing minimal disruption of the classroom atmosphere.

In virtually all the woodwork rooms visited, the rules for students' behaviour were well established and understood by all, and these rules were often displayed in notices. Indeed it was generally the practice to deal with the rules of the woodwork room in detail when new students were welcomed into the room for the first time.

Generally, students were being exposed to the full range of syllabus topics in MTW. While this was also generally the case in CS, there were occasions where the full range of higher-level topics was not being covered in CS.

In the large majority of instances MTW and CS practical, theory and drawing lessons were well structured and appropriately paced, related to previous and future lessons, and took account of the different needs, interests and abilities of the students. The purpose of the lessons was generally made clear to the students at the outset. The content of lessons observed was generally appropriate for the year group and the time of year and was directly related to the relevant syllabus.

Clear classroom routines were in evidence during virtually all practical, drawing and theory lessons. These routines are particularly important in woodwork rooms when practical lessons are being undertaken, as they serve to ensure that the learning environment is well organised, well managed and safe during activities. Routines also encourage the responsibility of students before, during and at the end of lessons and contribute to the general learning experience associated with MTW and CS. The use of these routines was always commended in inspection reports.

Features of good practice

- In almost all instances lessons were well planned and structured to ensure continuity and progress through programmes of work
- Most programmes of work were in line with the requirements of the appropriate syllabus
- Woodwork rooms were well managed and students' behaviour was characterised by high levels of engagement and motivation in almost all schools
- Classroom routines were regularly used in almost all lessons

Concerns

- Lessons were not appropriately structured in a small number of schools
- Classrooms were not well managed in a few schools
- Classroom routines were not established or used in a few schools

4.3 Practical and project work

4.3.1 Design-based practical and project work

Practical and project work in MTW and CS is intended to encourage students to develop their practical problem-solving abilities and associated skills in innovative and creative ways. Practical activities should encourage students to apply appropriate knowledge and skills through the systematic design and execution of solutions, using a design process. This type of design-based practical and project work is now widespread in MTW and CS classrooms, and the development of material-processing skills traditionally associated with the subjects is undertaken during the realisation of practical work on projects following engagement with the design process.

It is important to emphasise the adoption of the design process when undertaking practical and project work, and this should incorporate the development of marking-out and processing skills. The emphasis should therefore be on designing and executing the design while incorporating the skills traditionally associated with the subjects. It should also be noted that these design and traditional processing skills are in a constant state of evolution, and cognisance should always be taken of this factor by teachers.

4.3.2 The design brief

The design brief issued by the State Examinations Commission suggests the amount of time that third-year students should spend on project work for the purposes of the State examinations, and guidelines issued annually state when project work should be completed. Junior Certificate MTW project work usually begins immediately following the issuing of the design brief in November and should be completed before the final date for project work given in the timetable for examinations. Project work is completed in a series of linked steps, many of which are revisited as students complete their folio and artefact in tandem. This is followed by the student's evaluation of the entire process.

The CS syllabus defines both the type of project work that students must complete and the amount of course time that should be devoted to its completion. Time allocated to project work should reflect the proportion of assessment marks allocated to project work in the syllabus, namely that higher-level and ordinary-level students should spend 25% and 30% of course time, respectively, on their project work. Teachers frequently reported that Leaving Certificate students spent considerably more time than is appropriate on project work, sometimes to the detriment of other aspects of the subject and indeed other subjects being studied. The inspectors often recommended that teachers assist students in managing

projects to ensure that the balance within the subject is not compromised and that time spent on CS project work does not interfere with work in other subject areas.

4.3.3 The nature and variety of project work

The nature of MTW projects undertaken for the Junior Certificate is governed by the brief issued by the SEC, with higher-level and ordinary-level students having three projects each to choose from. Leaving Certificate students choose their own projects, under the guidance and direction of their teachers, and it is usual for a variety of building and wood craft, architectural heritage and other projects to be undertaken. Commenting on practical work a report stated:

> A wide variety of practical projects was being undertaken in MTW and CS. This allowed students to experience, directly or indirectly, the procedures and processes required for the completion of the range of project work envisaged by the syllabuses.

The variety of project work undertaken was often limited to one of the areas from which project work may be undertaken, so that students had no direct or indirect experience of the process associated with carrying out project work in the variety of areas described in the syllabus. This practice is not desirable. In such instances recommendations were made that students be exposed to projects from a greater variety of areas to ensure that their experiences reflected the content of the syllabus to the greatest extent possible and that they were adequately prepared for the State examinations.

Students' work on the practical aspect of their Junior Certificate MTW and Leaving Certificate CS projects was generally of a very high standard. However, difficulties in completing the accompanying portfolio were sometimes described by teachers.

The inspectors also encountered a variety of strategies for overcoming this difficulty. Some teachers required students to analyse the design brief first and research possible solutions. Students were then able to complete a design solution and make a scale model and working drawings of their final design before the construction of the full-scale object began. Making the scale model allowed students to identify potential difficulties with the design and to make modifications before beginning work on the full-scale object.

All students were encouraged to keep a project journal, in which entries were made after each lesson. These entries were monitored and dated by the teacher, and this process allowed students to calculate the amount of time spent on

the various stages of the work and to monitor their progress. In this way the completion of the portfolio and the realisation of the artefact project were excellently managed and progressed in tandem.

4.4 Health and safety

Using tools to complete the realisation of project work is an integral part of students' experience in MTW and CS, and the large majority of practical and project work is undertaken using a variety of hand tools and portable power tools. The inspectors observed students using both types in all practical lessons observed during inspections. Guidance provided in the MTW syllabus and in *Review of Occupational Health and Safety in the Technologies in Post-Primary Schools* (2005) should always be used in informing teachers' decisions concerning the appropriate use of hand and power tools by individual students during practical activities in the woodwork room.

Using potentially dangerous hand and portable power tools in practical and project work is an integral aspect of the study of MTW and CS. Teachers were generally acutely aware of the dangers inherent in woodwork rooms and of the need to develop a health and safety culture. This was evident in a number of ways: woodwork rooms were appropriately equipped with hand, portable power and machine tools, including an appropriate dust-extraction system; the physical environment in woodwork rooms was organised in a manner that emphasised the importance of and facilitated a safe working environment for teachers and students; personal protection equipment (PPE) was provided in the room and was appropriately used; the visual environment contained displays (signage and posters) that emphasised health and safety considerations; teachers demonstrated best health and safety practices in the completion of all their work; and all practical activities that students engaged in were closely monitored by teachers.

The correct use of safe operational areas is now fairly widespread in woodwork rooms, and this practice is improving all the time. It was often recommended that these safe areas be demarcated where this had not already been done, particularly where there was a separate wood preparation and machining area. It was urged that notices be displayed to clarify the rationale for these areas and to outline the implications for the movement and deportment of users of the machinery and others in the room.

The proper use of signs regarding the mandatory use of PPE was often commended, and practice in this area was

generally good. The role played by teachers in promoting the wearing of PPE cannot be emphasised enough, and teachers should always model best practice in this area when engaging in practical activities themselves in the classroom. The dual purpose of providing a high profile for issues of health and safety concern in woodwork rooms in addition to the need to provide a safe and healthy environment for students in studying MTW and CS was often alluded to by inspectors in their reports.

Displays related to the safe use of hand tools and portable power tools were relatively rare in woodwork rooms, and the development of such displays, either as student projects or by purchasing charts, was frequently recommended in inspection reports. The development of a visually attractive, subject-appropriate environment in the classroom by displaying students' work was often recommended by the inspectors in order to encourage ownership by the students of the classroom environment and all the materials within it.

Good housekeeping in woodwork rooms is essential in ensuring that the working environment in the room is safe, both for teachers and students. Because of the nature of the subjects and their associated tools and materials, it is essential that the woodwork room always be neat, tidy, and well organised, and this was generally the case during inspections. Occasionally, however, problems related to poor housekeeping were raised in the reports. For example, full use was not being made of the available space in some woodwork rooms because of poor planning. References were also made to poorly sited machinery. Obsolete machines were often retained in rooms. Materials were sometimes inappropriately stored, and large numbers of projects were sometimes stored in woodwork rooms. It was recommended that close attention be paid to making the best use of the space and facilities available in woodwork rooms when programmes of work are being planned, that all equipment and materials be appropriately stored, and that all unnecessary items be removed from the specialist classrooms.

4.5 The teaching of theory

Generally, the theoretical aspects of the MTW and CS syllabuses were taught best in practical settings in the course of lessons in the woodwork room. However, there are extensive sections of both subjects that are best delivered in a classroom setting.

The inspectors often commended the inclusion of activity-based learning, group and pair work as best practice in teaching and learning in practical lessons. They also

recommended that a wider range of teaching strategies be used in the teaching of MTW and CS theory, and that these include teaching methodologies similar to those used in teaching practical and drawing lessons. Planning for the implementation of such methodologies should be undertaken at subject-department level.

MTW and CS teachers sometimes used computer technology in their presentation of lessons. As well as enhancing the presentation of the lessons, this served to model the potential for the use of ICT and underlined the technological nature of the subjects. The use of ICT, including data projectors, for teaching the subjects was encouraged most strongly in relation to the teaching of theory.

Often teachers also used ICT to record attendance and the assessment of homework. Some schools plan to develop databases of digital demonstrations of significant processes in wood and construction technology as a resource for all students. These excellent initiatives were commended by the inspectors when they encountered them, as they serve to enhance the learning experience for students and also reinforce the technological nature of the subjects.

Features of good practice

- Activity-based learning was used frequently in the teaching of theoretical topics
- The promotion of the design process was central to the practical and project work undertaken with all year groups but especially with junior cycle MTW
- ICT was often used to record attendance and the assessment of homework
- Best health and safety practice was informed by *Review of Occupational Health and Safety in the Technologies in Post-Primary Schools* (2005) and was promoted and modelled by teachers in almost all schools

Concerns

- There was scope in the majority of lessons for developing the use of ICT
- The design process was not central to the practical and project work undertaken, especially with junior-cycle MTW class groups in very few schools
- The variety of project work undertaken at junior cycle was often limited to one of the areas from which project work may be selected
- Junior cycle students often had no direct or indirect experience of the process associated with carrying out project work in the full variety of areas described in the syllabus
- Active teaching methods were not being employed in a small number of schools
- Health and safety practices and procedures were not adequate or informed by the relevant Departmental guidelines in a small number of schools

4.6 Classroom atmosphere

An excellent rapport between students and teachers was generally evident in all lessons observed, and students were generally confident and secure during all classroom interactions. The atmosphere in woodwork rooms was predominantly positive and supportive of students and was marked by very good interpersonal communication between students and teachers.

The general level of mutual respect between students and teachers and among students themselves during the lessons visited was often commended. This respect was based to a large extent on the close co-operation that was characteristic of the lessons, in particular the practical lessons in which the teachers used suitable opportunities to affirm and reinforce the progress being made by students as well as providing help, as appropriate.

In many MTW and CS rooms the use of displays of subject-related materials to create a visually stimulating environment was commended. These materials included charts, posters, and samples of materials. This environment was often further enhanced by displays of students' practical, project and drawn work. Where this was not the case it was often recommended that current students' work be displayed, in the woodwork room where possible and in public display areas in the school where these were available.

Familiarity with and use of the terminology associated with MTW and CS technology is an integral part of teaching and learning in the subjects. The appropriate use of terminology was generally emphasised in woodwork rooms. The display of lists of new terminology, in both English and Irish, to reinforce students' learning was recommended at times, and this practice mirrors practice in other subject areas.

Teachers were commonly aware of their role in support of students' literacy and numeracy. This awareness, together with co-operation with SEN and LS teachers, often informed practice with regard to developing students' use of specific subject-related terminology and measurement skills.

Features of good practice

- There was a mutually respectful atmosphere among students and teachers in almost all classrooms
- In almost all lessons the teachers affirmed and encouraged the students
- There was a visually rich environment in most classrooms

Concerns

- A mutually respectful atmosphere was not evident in a few lessons
- In a few instances the students were not appropriately affirmed and encouraged
- The classroom environment would have benefitted from further displays of subject-related materials in a small number of schools

4.7 Students' learning

The quality of students' learning was reflected in their knowledge and understanding of the subjects and the extent of this was commonly demonstrated by their ability to ask and answer questions during lessons. Further evidence of their learning was seen in the competencies they exhibited in individual practical and project work and in drawn and written tasks undertaken in class or as homework. Efforts were continually being made during lessons to develop students' practical, drawing and theory skills to the highest possible levels.

Learning in MTW and CS practical, theory and drawing lessons was generally active and task-oriented, and students readily participated in the full range of classroom activities. The nature of the large majority of learning opportunities and activities designed by teachers also provided students with scope for independent and collaborative learning. They were encouraged to act on their initiative when appropriate.

The large majority of students demonstrated appropriate levels of subject-specific understanding, knowledge and skills during lessons observed and in their interactions with the inspectors. They communicated effectively in the language of MTW and CS technology in the course of the lessons observed, when responding to and asking questions and in particular when they engaged with the inspectors.

Quite often students made direct use of ICT, as a research tool for design-project investigation and occasionally to produce computer-aided drawings but predominantly for word-processing in presenting project-design coursework. In some instances they were given little support or direction in the best use of ICT, sometimes completing the work outside school. This practice fails to take advantage of a valuable opportunity to guide students' learning, both in the use of the technology and in the formation and development of their ideas and creative instincts and abilities.

Features of good practice

- Learning was active, task-oriented, participative and engaging in most lessons
- Students communicated in the terminology associated with the subjects in almost all lessons
- Opportunities were created in almost all lessons for independent learning and for students to demonstrate their initiative
- Students frequently used ICT as an aid to their learning

Concerns

- Learning was neither active nor task-oriented in a small number of lessons
- Opportunities for independent learning were not integrated in a few lessons
- In fewer than half of lessons students were given little support or direction in the best use of ICT

Chapter 5

The quality of assessment

5.1 Assessment modes

The inspectors noted that summative assessment of MTW and CS students was generally achieved by means of end-of-topic theory, drawing and practical classroom-based tests and during formal scheduled house examinations. These examinations were supplemented regularly with elements of continuous assessment, in which practical and project work, freehand and scaled drawn work and the quality of students' notebooks were assessed. It was reasonably widespread practice to aggregate continuous assessment marks at Christmas and in summer and to combine these with summative assessment marks to arrive at an overall attainment grade for the subjects for inclusion in the end-of-term reports to parents.

It was frequently recommended by the inspectors that the weighting of the marks between continuous assessment and examinations and between design work and realisation in the assessment of projects be agreed by subject departments and made clear to students. Such certainty regarding teachers' expectations of students provided encouragement for continuing efforts on their part and provided very effective feedback on their progress. The weightings adopted for use in MTW and CS should always be consistent with those in use by the State Examinations Commission. Regular feedback to students on their progress provided a most effective means of reinforcing learning and was encouraged by the inspectors in their reports.

The use of continuous informal assessment of students' work was also widespread, particularly in practical and project classes. Teachers usually circulated among students and provided focused and detailed help, encouragement, and affirmation, as appropriate. This was good use of formative assessment.

The inspectors often recommended in their reports that when marking MTW projects teachers should give appropriate weighting to students' proper use of the design process before the construction of the artefact. This allows the students to become accustomed to this type of assessment from the outset.

The existence of separate MTW and CS class groups in different option bands in many schools meant that common examinations were often necessary. The inspectors often commended this arrangement when it was encountered, because it allowed common examination papers and project briefs to be used, encouraged discussion among students, and helped to develop an increased awareness of the subjects.

5.2 Homework

While the setting and correcting of homework was generally a feature of assessment in MTW and CS, this was not always so. Where homework was not regularly set and corrected, the inspectors recommended that practice be changed in order to ensure that contact with the subjects was maintained throughout the school week and that homework would become an integral part of the assessment process in the MTW and CS subject department. Recommendations that the school's homework policy be applied in MTW and CS, as in every other subject area, were also frequently made.

Features of good practice

- An appropriate variety of assessment modes was used in almost all schools
- Homework was regularly set, corrected, annotated, graded, and recorded in the majority of schools

Concerns

- The variety of assessment modes that was in operation was limited in a few schools
- In a number of schools homework was not regularly set or corrected

5.3 Record-keeping and reporting

The inspectors reported that teachers usually recorded students' achievement, progress and attendance in a journal. These journals were also used to keep a record of the work completed in lessons and the homework set, received, and graded. Keeping rigorous records in this manner presented opportunities to compare the relative effectiveness of the teaching methodologies and prompted debate about the best approaches to teaching various parts of the syllabus at planning meetings. A small minority of teachers did not maintain records of students' achievement or progress.

The MTW and CS teachers generally kept careful records of students' attendance at lessons and their attainment in assessments, and many schools provided their teachers with journals specifically for this purpose. There was generally good practice with regard to the communication of results to parents by means of formal school reports, parent-teacher meetings, and entries in the students' journals. One report contained the following comment:

> Student work is regularly assessed, records of attainment are regularly recorded and these are used to inform future teaching strategies and parents of students' progress.

It is imperative that students receive oral and written feedback following all assessments of their work. The inspectors noted that teachers frequently gave oral feedback but rarely gave written feedback on written, drawn or practical work. Providing students with written feedback is an essential element of the assessment-for-learning process, as through it students are made aware of their strengths and of areas in which they must develop further. Recommendations encouraging the provision of written feedback were frequently made where it was not being provided.

Features of good practice

- Records of students' homework and classwork were kept by teachers in almost all instances
- Constructive oral feedback was given frequently in almost all schools and written feedback was given regularly in a small number of schools

Concerns

- Adequate records were not being kept in a few instances
- Students were not given regular written feedback in most schools

5.4 Students' engagement

Students generally displayed high levels of motivation and positive attitudes to the subjects during their interactions with the inspectors during class visits. They generally displayed an acceptably comprehensive knowledge and understanding of the concepts and skills associated with the subjects when particular context factors were considered.

MTW and CS are subjects that have both a practical and a theoretical aspect. To experience success, students must develop an understanding of underlying principles and acquire a body of appropriate knowledge, together with the requisite practical and intellectual skills. In the majority of classrooms visited the students' practical skills were of a high standard, but occasionally it was recommended that more emphasis be placed on the development of appropriate practical skills.

While students demonstrated similar high levels of theory and drawing skills, the same levels of rigour in teaching these were not always evident in theory and drawing lessons. This is an issue that must be addressed in order that students optimise their experience of studying MTW and CS.

Features of good practice

- Students in almost all lessons displayed high levels of motivation and positive attitudes to the subjects
- Students' subject knowledge was comprehensive in most instances
- Students' design, practical, drawing and theory skills were highly developed in most schools

Concerns

- Students displayed indifferent attitudes to the subjects or were poorly motivated in a small number of instances
- Students' subject knowledge, and associated skills, were not appropriately developed in a few schools

5.5 Students' overall achievement

An analysis of the outcome of summative house assessments and State examinations is becoming pervasive in schools. This process was often undertaken during subject-department meetings where a comparison of results in State examinations with the national averages for these subjects was often used to inform planning. The inspectors often commended this approach.

The level of students' performance during inspections tended to be in line with expectations in the schools visited. The standard of practical and project work completed by MTW and CS students was generally very high, reflecting a high level of competence in the marking-out and processing skills associated with the subjects while remaining consistent with the range of students' abilities in the lessons evaluated.

The inspectors noted, and teachers and senior management in schools frequently expressed concern about, the falling standard in the traditional marking-out and processing skills associated with MTW since the introduction of the current MTW syllabus in the early 1990s. This fall in standards was often attributed to a variety of contributory factors, including the emphasis placed on the design process by the new syllabus.

This change in emphasis has resulted, to some extent at least, in the better development of students' design skills. However, the intention of the MTW syllabus is not to sacrifice the acquisition of practical skills for the development of design skills. Rather it seeks to enrich students' experiences by engaging them intellectually and creatively in design while placing the development of skills in context by giving it a purpose. The inspectors noted frequently in their reports that the aims of the syllabus placed an emphasis on the development of design and processing skills in tandem. They recommended that the schools should always promote a balanced development of design and processing skills and that students' project work in MTW should reflect this dual emphasis.

In theory lessons, students displayed appropriate levels of knowledge of principles and concepts consistent with their abilities and experience. The standard of freehand, scaled, ruled and computer-generated drawings in students' notebooks and portfolios was generally high. However, the inspectors have noted that a decline in the standard of students' scaled and freehand drawings has occurred in recent years. This is a matter of some concern, and recommendations emphasising the need to improve freehand and ruled drawing skills were frequently made in reports.

As MTW and CS subject-department structures become more common, more planning time is devoted to the collective analysis of results in State examinations. This usually formed a significant part of the agenda of beginning-of-year subject-department meetings, and in many instances this analysis was being used to inform planning priorities for the school year. This practice was often commended in inspection reports.

Features of good practice

- To assist with subject planning students' performance in State examinations was being analysed annually, and comparisons with national norms were being made in most schools

Concerns

- In a small number of schools it was recommended that students' performance in State examinations be analysed or compared with national norms by the MTW and CS subject department with a view to improving subject planning

Chapter 6

Summary of main findings and recommendations

The quality of subject provision and whole-school support

Main findings

Whole-school support for MTW and CS was generally very strong.

The subjects were taught almost exclusively by qualified and enthusiastic MTW and CS teachers.

Timetabling provision for the subjects was generally appropriate.

Provision for health and safety requirements was generally adequate.

The facilities used for teaching the subjects were generally adequate.

Most schools now have appropriate dust-extraction systems.

Teachers and students often did not have adequate access to appropriate ICT resources.

There was a significant gender imbalance in the uptake of the subjects, especially in CS.

MTW or CS was usually included as a module in TY programmes.

There were usually procedures for facilitating liaison between subject teachers and the SEN and LS team.

The continuous professional development of teachers was being facilitated and encouraged.

Recommendations

Teachers should be timetabled for a combination of junior cycle and senior cycle classes.

Students should have open access to the subjects and experience them, where possible, before making their optional subject choices.

An appropriate MTW or CS module should be included in TY programmes.

Schools should examine the factors influencing the gender imbalance in the uptake of the subjects and should develop strategies to address these.

Schools should ensure, as a priority, that they make adequate provision for health and safety in MTW and CS.

The quality of planning and preparation

Main findings

There are now formal MTW and CS subject-department structures in many schools and co-ordinators of the subjects have been appointed in many schools..

Formal meetings of MTW and CS subject departments are facilitated as often as practicable.

Subject plans have been developed and are being implemented in most schools.

Planning for the introduction of the new LC syllabuses was being undertaken in many schools.

Recommendations

Subject-department structures should be developed in schools where they do not already exist.

Subject plans should be developed in all schools, and these should address every aspect of the provision of the subjects.

Provision should be made for a regular review of the subject plans.

Planning should concentrate on the syllabus and not on examinations.

The quality of teaching and learning

Main findings

Teachers were generally expert and enthusiastic practitioners.

A variety of teaching methods and strategies was being employed in practical, project, theory and drawing lessons.

Demonstrations were regularly used in practical, drawing and theory lessons. The progress cycle of teacher demonstrating, student undertaking task and teacher circulating and monitoring was regularly repeated during lessons.

Lessons were well planned and structured to ensure continuity and progress through the syllabuses and schemes.

Differentiation of teaching methods and content was evident during lessons.

Best health and safety practices were promoted and modelled by teachers.

Specialist classrooms were well managed, and students were engaged and motivated.

Classroom routines were regularly used.

An excellent teacher-student rapport was evident in virtually all classrooms.

Learning was active and task-oriented, and students demonstrated their understanding and competence during the completion of practical and project work, drawings, and theory tasks.

Concerns were expressed about the falling standard in the traditional marking-out and processing skills associated with MTW.

Students communicated in terminology associated with the subjects.

Recommendations

The promotion of the design process in the junior cycle should be used more extensively throughout the three years of the programme.

Lessons should concentrate on teaching the syllabus content and not on the terminal examination.

Lesson content should be differentiated to meet the needs of individual students.

Schools should promote a balanced, simultaneous development of design and processing skills, as recommended by the MTW syllabus; and students' project work in MTW should reflect this dual emphasis.

Active, task-oriented learning should be promoted in all practical, drawing and theory lessons.

Efforts to enhance students' MTW and CS subject-specific knowledge and design, practical and communication skills should continually be made.

The quality of assessment

Main findings

A variety of assessment modes was being used.

Homework was generally set regularly, corrected, commented on, graded and recorded in schools.

Constructive oral and written feedback was given regularly in many schools.

Assessment for learning and assessment of learning were being used.

Records of all students' homework and class work assignments were being kept.

An analysis of students' performance in State examinations was being undertaken by subject teachers and the school authorities.

Recommendations

A variety of subject-specific assessment modes should be employed.

Homework should be regularly set, corrected, and recorded in all schools.

Written feedback should be provided to supplement oral feedback given during lessons.

Appendix

References

Department of Education and Science (1984). *Leaving Certificate Construction Studies Syllabus.* Dublin: Stationery Office.

Department of Education and Science (1992). *Junior Certificate Materials Technology (Wood) Syllabus.* Dublin: Stationery Office.

Department of Education and Science (2001). *Circular Letter M45/01: Wood Dust Extraction in Second Level Schools*. Department of Education and Science web site (www.education.ie), accessed August 2007.

Department of Education and Science (2005). *Circular Letter PBU 5/2005: Review of Occupational Health and Safety in the Technologies in Post-Primary School*. Department of Education and Science web site (www.education.ie), accessed August 2007.

Department of Education and Science and State Claims Agency (2005). *Review of Occupational Health and Safety in the Technologies in Post-Primary Schools.* Dublin: Department of Education and Science and State Claims Agency.

Useful web sites

General education web sites

www.education.ie	Department of Education and Science
www.examinations.ie	State Examinations Commission
www.ncca.ie	National Council for Curriculum and Assessment
www.sdpi.ie	School Development Planning Initiative
www.slss.ie	Second Level Support Service
www.ncte.ie	National Council for Technology in Education
www.sess.ie	Special Education Support Service
www.scoilnet.ie	Scoilnet (general on-line resources for schools)

Subject-specific information

www.t4.ie	Technology Subjects Support Service (T4)
www.technoteachers.ie	Techno Teachers' Association